Re-evaluation Decision RVD2010-05

# Copper Pesticides

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## Re-evaluation Decision

After a re-evaluation of copper-containing pesticides, Health Canada's Pest Management Regulatory Agency (PMRA), under the authority of the *Pest Control Products Act* and Regulations, is granting continued registration of currently registered products containing the following copper-based active ingredients: cuprous oxide, cupric oxide, copper sulphate, copper sulfate pentahydrate, copper oxychloride, copper hydroxide and metallic copper. The uses that are eligible for continued registration are detailed in Appendix V, and include the following: agricultural uses; forestry uses; direct aquatic uses for the control of weeds and algae as well as for control of bacterial odour in sewage water, sludge, etc.; and industrial use sites.

An evaluation of available scientific information found that products containing copper-based active ingredients do not pose risks of concern to human health or the environment, that is, when applied in agricultural (for example, terrestrial crops and ornamentals) or industrial settings, or directly applied to water in confined systems (for example, sewage water, ponds, tanks, swimming pools). As a condition of the continued registration of copper-containing products, new risk-reduction measures must be included on the label of products registered for the above-mentioned uses. These measures are required to further protect human health and the environment. For wood and material preservatives, the evaluation of the available scientific information found that copper-containing products do not pose risks of concern to human health, and as a condition of continued registration, additional risk mitigation measures are required for the products labels. Risks to the environment from the wood and material preservative uses of copper-containing products will be assessed in the future and will be communicated in a separate document. Appendix III and IV lists required label amendments. No additional data is required at this time.

The regulatory approach for the re-evaluation of copper-containing pesticides was first presented in Proposed Re-evaluation Decision document PRVD2009-04, *Copper Pesticides*, a consultation document.[1] The proposed decision was largely based the United States Environmental Protection Agency (USEPA) Reregistration Eligibility Decision (RED) document for coppers (2006). Following the issuance of PRVD2009-04, the USEPA has published a revised RED document (2009) for coppers. A review of this revised RED document, and of comments received during the consultation process, resulted in changes to the proposed regulatory decision as described in the PRVD.

This Re-evaluation Decision document[2] describes this stage of PMRA's regulatory process for the re-evaluation of copper-containing pesticides as well as summarizes the Agency's decision and the reasons for it. Appendix I summarizes the comments received during the consultation process and provides the PMRA's response. Appendix II summarizes the changes made to the proposed regulatory decision for coppers. These changes include modifications to the requirements pertaining to application instructions, restricted-entry intervals and personal

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1 "Consultation statement" as required by subsection 28(2) of the *Pest Control Products Act*.

2 "Decision statement" as required by subsection 28(5) of the *Pest Control Products Act*.

protective equipment. To comply with this decision, registrants of products containing the forms of copper re-evaluated for this decision will be informed of the specific requirements affecting their product registration(s).

## What Does Health Canada Consider When Making a Re-evaluation Decision?

The PMRA's pesticide re-evaluation program considers potential risks, as well as value, of pesticide products to ensure they meet modern standards established to protect human health and the environment. Regulatory Directive DIR2001-03, *PMRA Re-evaluation Program*, presents the details of the re-evaluation activities and program structure.

The copper moiety of seven active ingredients in the current re-evaluation cycle has been re-evaluated under Re-evaluation Program 1. This program relies as much as possible on foreign reviews, typically United States Environmental Protection Agency Reregistration Eligibility Decision documents. For products to be re-evaluated under Program 1, the foreign review must meet the following conditions:

- it covers the main science areas, such as human health and the environment, that are necessary for Canadian regulatory decisions;
- it addresses the active ingredient and the main formulation types registered in Canada; and
- it is relevant to registered Canadian uses.

Based on the outcome of foreign reviews and a review of the chemistry of Canadian products, the PMRA has made a regulatory decision and requires appropriate risk-reduction measures for Canadian uses of copper-containing pesticides. In this decision, the PMRA took into account the Canadian use pattern and issues.

The United States Environmental Protection Agency re-evaluated copper-containing pesticides and published its conclusions in a Reregistration Eligibility Decision (RED) document (2006). In May 2009, the USEPA published a revised RED document for coppers. This revised document included modifications to the required restricted-entry intervals and clarifications to the application rate recommendations.

For more details on the information presented in this Re-evaluation Decision, please refer to the Science Evaluation in the related Proposed Re-evaluation Decision PRVD2009-04, *Copper Pesticides*.

## What Are Copper-Containing Pesticides?

Copper-containing pesticides are formulated using various forms of copper, which ultimately dissociate into cupric ion complexes and compounds, including the cupric ion ($Cu^{2+}$), which is the active component.

Copper-containing pesticides are registered as broad spectrum fungicides, bactericides, herbicides and antifouling agents for use on a variety of agricultural crops and ornamentals, in industrial processes (for example, as wood and material preservatives), and in industrial areas (for vegetation control). Copper is also added directly to water to control algae, weeds and bacterial growth, and is applied as a plant growth regulator on nursery stock and tree seedling containers.

Seven active ingredients containing copper were considered when conducting this review. Four of these chemicals (copper sulfate pentahydrate, copper oxychloride, copper hydroxide and copper sulphate) are registered for agriculture uses, forestry uses, direct aquatic uses or industrial use sites. The active ingredients registered as wood and material preservatives are cuprous oxide, copper hydroxide, metallic copper powder and cupric oxide. This document focuses on the risks to human health from all registered uses in Canada, and on the risks to the environment from agriculture uses, forestry uses, direct aquatic uses and industrial use sites. The risks to the environment from the wood and material preservative uses of copper-containing pesticides will be assessed in a future review.

## Health Considerations

### Can Approved Uses of Copper Affect Human Health?

**Copper is unlikely to affect your health when used according to the revised label directions.**

People could be exposed to pesticides containing copper through consumption of food and water, working as a mixer/loader/applicator or by entering treated sites. The PMRA considers two key factors when assessing health risks: the levels at which no health effects occur and the levels to which people may be exposed. The dose levels used to assess risks are established to protect the most sensitive human population (for example, children and nursing mothers). Only uses for which exposure is well below levels that cause no effects in animal testing are considered acceptable for continued registration.

The USEPA concluded that the use of copper-containing pesticides was unlikely to affect human health provided that risk-reduction measures were implemented. These conclusions apply to the Canadian situation, and equivalent risk-reduction measures are required.

### Maximum Residue Limits

The *Food and Drugs Act* prohibits the sale of food containing a pesticide residue that exceeds the established maximum residue limit (MRL). Pesticide maximum residue limits are established for *Food and Drugs Act* purposes through the evaluation of scientific data under the *Pest Control Products Act*. Each MRL value defines the maximum concentration in parts per million of a pesticide allowed in or on certain foods. Food containing a pesticide residue that does not exceed the established MRL does not pose an unacceptable health risk.

Copper is currently registered in Canada for use on many fruits, vegetables and nuts and could be used in other countries on crops that are imported into Canada. Canada has a 50 parts per million maximum residue limit for fresh fruits and vegetables. Where no specific MRL has been established (for example nuts), a default MRL of 0.1 ppm applies, which means that pesticide residues in a food commodity must not exceed 0.1 ppm. However, changes to this general MRL may be implemented in the future, as indicated in Discussion Document DIS2006-01, *Revocation of 0.1 ppm as a General Maximum Residue Limit for Food Pesticide Residues [Regulation B.15.002(1)]*. If and when the general MRL is revoked, a transition strategy will be established to allow permanent MRLs to be set.

## Environmental Considerations

### What Happens When Copper Is Introduced Into the Environment?

**Copper is unlikely to affect non-target organisms when used according to the revised label directions.**

Non-target organisms could be exposed to copper in the environment. Environmental risk is assessed by the risk quotient method—the ratio of the estimated environmental concentration to the relevant effects endpoint of concern. In this screening level assessment, the resulting risk quotients are compared to corresponding levels of concern. A risk quotient less than the level of concern is considered a low risk to non-target organisms, whereas a risk quotient greater than the level of concern indicates potential risks of concern.

The USEPA concluded that the reregistration of the "agricultural uses" (these included terrestrial crops, ornamentals and direct aquatic uses) of copper-containing pesticides was acceptable provided risk-reduction measures to further protect the environment were implemented. These conclusions apply to the Canadian situation, and equivalent risk-reduction measures are required. Furthermore, the PMRA will require aquatic and terrestrial buffer zones for agricultural uses to further protect aquatic organisms and terrestrial plants from spray drift.

## Measures to Minimize Risk

Labels of registered pesticide products include specific instructions for use. Directions include risk-reduction measures to protect human and environmental health. These directions must be followed by law. As a result of the re-evaluation of copper-containing pesticides, the PMRA is requiring further risk-reduction measures for product labels.

**Human Health**

- Additional advisory label statements
- Additional protective equipment to protect mixers/loaders/applicators
- A restricted-entry interval to protect workers re-entering treated sites

**Environment**

- Additional advisory label statements
- Buffer zones to protect sensitive aquatic and terrestrial habitats
- Changes to number of yearly applications or minimum application intervals

Appendix III and IV list all required label amendments, including instructions related to basic hygiene practices.

## Other Information

Any person may file a notice of objection[3] regarding this decision on copper-containing pesticides within 60 days from the date of publication of this Re-evaluation Decision. For more information regarding the basis for objecting (which must be based on scientific grounds), please refer to the Pesticides and Pest Management portion of Health Canada's website (Request a Reconsideration of Decision) or contact the PMRA's Pest Management Information Service.

[3] As per subsection 35(1) of the *Pest Control Products Act*.

# Appendix I Comments and Responses

## 1.0 Comment on the Calculation of Buffer Zones

In calculating buffer zones to protect non-target organisms, the PMRA uses the most sensitive species. This is unnecessarily restrictive.

**Response**

When conducting an environmental risk assessment, it is impossible to have toxicity studies on all organisms that can potentially be exposed to the pesticide in question. In lieu of the specific data, it is common practice to use surrogate species to represent all species within that taxonomic group in the risk assessments at the screening level and for the determination of mitigation measures.

## 2.0 Comment on the Proposed Label Amendments

The proposed environmental hazards statements, listed in Appendix II of PRVD2009-04, appear to be required for all commercial class end-use products. These would not be appropriate for products such as antifouling agents for the treatment of fishing nets, and would contradict current label statements.

**Response**

The environmental hazards statements listed in Appendix II of PRVD2009-04 are not required for products registered for material preservative uses, since an environmental risk assessment has not been conducted for those uses. These statements are required for agricultural uses, forestry uses, direct aquatic uses and industrial use sites. In the Re-evaluation Decision document, the list of required label amendments has been divided into two Appendices (one for domestic class products and one for commercial class products) and has been modified to provide further clarification.

# Appendix II Summary of Changes Made for Copper Pesticides

## 1.0 Application Instructions

The re-evaluation of coppers lead to the conclusion that label directions in Canada are often incomplete, with respect to application rates, maximum number of applications per year, and application intervals. The adoption of the USEPA recommendations, with respect to application instructions for copper pesticides, was proposed in PRVD2009-04. The PMRA requested comments as to the feasibility of these recommendations for Canadian use pattern; as part of the public consultation, no comments were received on this specific measure.

Consideration was given to adopting the American application instructions (as described in Appendix IV of PRVD2009-04) for Canadian uses of copper pesticides. However, it was noted that there were considerable differences between the American application instructions and, those currently on Canadian labels. On this basis, it was decided that the full adoption of the American application instructions was not appropriate in Canada.

As part of its Re-evaluation Decision for copper pesticides, the PMRA is requiring that the labels of Canadian commercial class products be amended to reflect the application instructions provided in Appendix V. These application instructions were used as assumptions for the buffer zone calculations (when applicable), and are based on what is reflected on current Canadian labels, as well as maximum annual rates and minimum application intervals provided in the USEPA RED. The labels of domestic class products registered for use on ornamentals, or garden fruits and vegetables must also be revised to include maximum application rates, application intervals (days) and a maximum number of applications per year.

## 2.0 Personal Protective Equipment

In PRVD2009-04, baseline personal protective equipment (long pants, a long-sleeved shirt and shoes plus socks) was required for all commercial class products containing copper. However, some of the active ingredients included in the re-evaluation are acutely toxic through dermal exposure and/or are severe eye irritants. Based on this, and the personal protective equipment required by the USEPA for early re-entry, the following is required for Canadian labels for products containing copper hydroxide, copper sulphate pentahydrate, metallic copper or copper oxychloride:

> Wear goggles, long pants, a long-sleeved shirt and shoes plus socks during mixing/loading, application, clean-up and repair. In addition, wear chemical-resistant gloves during mixing/loading, clean-up and repair.

## 3.0 Environmental Hazards Statements

The following statements are required on Canadian labels. These requirements are based on risk quotients exceeding the level of concerns for birds, mammals, aquatic organisms and non-target terrestrial plants at application rates equivalent to or lower than Canadian maximum application rates.

For agricultural and forestry uses:

> TOXIC to birds, small wild mammals, aquatic organisms and non-target terrestrial plants.

For aquatic uses:

> TOXIC to aquatic organisms.

## 4.0 Good Hygiene Practices

**4.1 In PRVD2009-04, the following statement was required for domestic class products registered for use in swimming pools; however, based on the use site, this statement is no longer required.**

Wipe clean all surfaces that come into direct contact with food, such as counters, tables and stovetops.

**4.2 In PRVD2009-04, the following statement was required for domestic class products registered for use in swimming pools:**

Always store this product out of reach of children and pets and away from food and beverages.

In the decision document, this statement has been replaced by a more up-to-date statement (Keep out of reach of children), and is required for all domestic class end-use products.

## 5.0 Restricted-entry Interval

For products containing copper hydroxide, copper oxychloride, copper sulphate or copper sulfate pentahydrate, a 48-hour restricted-entry interval was required in PRVD2009-04 for products applied on crops and ornamentals, based on the USEPA RED (2006). This requirement was amended by the USEPA, in the revised RED (2009), as outlined below. These requirements are also required by the PMRA.

For products registered for use in greenhouses, the restricted-entry interval can be reduced to 24 hours, if the following statements are included on labels:

> DO NOT enter or allow worker entry into treated areas during the restricted-entry interval of 24 hours.
>
> At least one container or station designed specifically for flushing eyes must be available, and in operating condition with decontamination supplies, for workers entering the treated area. This container/station must remain available for at least seven days following application.

Applicators must post warning signs bearing the following information on all entrances to the greenhouse:

- The name of the product applied.
- The date and time of the application.
- "Product residues in the treated area may be highly irritating to the eyes."
- "Avoid contact of product residues with eyes."
- "If in eyes: Hold eye open and rinse slowly and gently with water for 15–20 minutes using the eye flush container [or eye flush station] located in the greenhouse. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice."
- The location of the eye flush container/station.
- Instructions on how to operate the eye flush container/station.

Signs must remain posted at least 7 days after treatment. Only the applicator(s) (or someone under their supervision) may remove warning signs.

## 6.0 Buffer Zones

In PRVD2009-04, buffer zones were not calculated for Brussels sprouts. Terrestrial and aquatic buffer zones for the use of copper pesticides on Brussels sprouts were calculated.

## 7.0 Precautions

**7.1 In PRVD2009-04, the following statements were required for commercial class products registered in nursery stock containers, for aquatic uses or non-agricultural uses; however, based on the use sites (for example, direct water applications, wood treatment, antifouling paint), these statements are no longer required.**

DO NOT enter or allow others to enter until sprays have dried.

DO NOT enter or allow others to enter until dusts have settled.

**7.2 In PRVD2009-04, the following statement was required, based on the USEPA RED (2006), for commercial class products registered for the treatment of potable water sources:**

Potable water sources treated with copper products may be used as drinking water only after proper additional potable water treatments.

This statement was replaced by the following, in the revised RED (2009), and this change is reflected in the decision document.

For applications in water destined for use as drinking water, those waters must receive additional and separate potable water treatment. DO NOT apply more than 1.0 ppm as metallic copper in these waters.

# Appendix III Revised Label Amendments for Domestic Class End-use Products Containing Copper

The label amendments presented below do not include all label requirements for individual end-use products, such as first aid statements, disposal statements, precautionary statements and supplementary protective equipment. Additional information on labels of currently registered products should not be removed unless it contradicts the label statements below.

The labels of domestic class end-use products in Canada must be amended to include the following statements to further protect workers and the environment.

A. For products registered for use on ornamentals or garden fruits and vegetables

Product labels must be revised to include specific maximum application rates, application intervals (days) and seasonal maximum application rates.

B. For all products

The following statements must be included in a section entitled **PRECAUTIONS**.

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Keep out of reach of children.

*For products applied as spray*: **DO NOT** allow adults, children or pets to enter the treated area until sprays have dried.

*For products applied as dusts or powders*: **DO NOT** allow adults, children or pets to enter the treated area until dusts have settled.

C. For products registered for use on ornamentals, or garden fruits and vegetables

I) The following statements must be included in a section entitled **DIRECTIONS FOR USE**.

**DO NOT** apply this product in a way that will contact adults, children or pets, either directly or through drift.

**DO NOT** contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

**DO NOT** apply to any body of water.

*For products applied as spray, dusts or powders*: Avoid application of this product when winds are gusty.

II) The following statement must be included in a section entitled **ENVIRONMENTAL HAZARDS**.

**TOXIC** to birds, small wild mammals, aquatic organisms and non-target terrestrial plants.

To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil or clay.

Avoid application when heavy rain is forecast.

Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

D. For products registered for direct aquatic uses

I) The following statements must be included in a section entitled **DIRECTIONS FOR USE**.

**DO NOT** contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

*For products formulated as dusts or powders*: **DO NOT** apply this product in a way that will contact adults, children or pets, either directly or through drift. Avoid application of this product when winds are gusty.

*For products formulated as granules or tablets*: DO NOT apply this product in a way that will result in direct contact with adults, children or pets.

II) The following statement must be included in a section entitled **ENVIRONMENTAL HAZARDS**.

TOXIC to aquatic organisms.

# Appendix IV Revised Label Amendments for Commercial Class End-use Products Containing Copper

The label amendments presented below do not include all label requirements for individual end-use products, such as first aid statements, disposal statements, precautionary statements and supplementary protective equipment. Additional information on labels of currently registered products should not be removed unless it contradicts the label statements below.

The labels of commercial class end-use products in Canada must be amended to include the following statements to further protect workers and the environment.

A. For products registered for agricultural uses, forestry uses, direct aquatic uses or industrial use sites

The label must be amended to reflect the application instructions shown in Appendix V.

B. For products registered for vegetation control in industrial sites or for root control in nursery stock and tree seedling containers.

I) The following statements must be included in a section entitled **PRECAUTIONS**.

Wear goggles, long pants, a long-sleeved shirt and shoes plus socks during mixing/loading, application, clean-up and repair. In addition, wear chemical-resistant gloves during mixing/loading, clean-up and repair.

Remove personal protective equipment immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Remove clothing/personal protective equipment immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

For cleaning/maintaining personal protective equipment, use detergent and hot water. Keep and wash personal protective equipment separately from other laundry.

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

C. For products registered for use on crops or ornamentals

I) The following statements must be included in a section entitled **PRECAUTIONS**.

a) For all products

Remove personal protective equipment immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.

Remove clothing/personal protective equipment immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

For cleaning/maintaining personal protective equipment, use detergent and hot water. Keep and wash personal protective equipment separately from other laundry.

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

If gloves are required on the label, wash the outside of gloves before removing.

b) For products containing cuprous oxide, copper sulphate or cupric oxide

Wear long pants, a long-sleeved shirt and shoes plus socks during mixing/loading, application, clean-up and repair.

c) For products containing copper hydroxide, copper sulphate pentahydrate, metallic copper or copper oxychloride

Wear goggles, long pants, a long-sleeved shirt and shoes plus socks during mixing/loading, application, clean-up and repair. In addition, wear chemical-resistant gloves during mixing/loading, clean-up and repair.

d) For products containing copper hydroxide, copper oxychloride, copper sulphate or copper sulfate pentahydrate

**DO NOT** enter or allow worker entry into treated areas during the restricted-entry interval of 48 hours.

For products registered for use in greenhouses, the restricted-entry interval can be reduced to 24 hours, if the following statements are included on labels

**DO NOT** enter or allow worker entry into treated areas during the restricted-entry interval of 24 hours.

At least one container or station designed specifically for flushing eyes must be available, and in operating condition with decontamination supplies, for workers entering the treated area. This container/station must remain available for at least seven days following application.

Applicators must post warning signs bearing the following information on all entrances to the greenhouse:

- The name of the product applied.
- The date and time of the application.
- "Product residues in the treated area may be highly irritating to the eyes."
- "Avoid contact of product residues with eyes."
- "If in eyes: Hold eye open and rinse slowly and gently with water for 15–20 minutes using the eye flush container [or eye flush station] located in the greenhouse. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice."
- The location of the eye flush container/station.
- Instructions on how to operate the eye flush container/station.

Signs must remain posted at least 7 days after treatment. Only the applicator(s) (or someone under their supervision) may remove warning signs.

e) For products containing copper oxychloride, copper sulfate or cuprous oxide

Post a warning signs at entrances to treated areas notifying workers of the application of the product.

II) The following statements must be included in a section entitled **DIRECTIONS FOR USE**.

**DO NOT** apply this product in a way that will contact workers or bystanders, either directly or through drift. Only protected handlers may be in the area during application.

**DO NOT** apply this product directly to freshwater habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands), estuarine/marine habitats.

**DO NOT** contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

*The following statement is required on all products, unless aerial application is permitted:* **DO NOT** apply by air.

**Buffer zones**

Field sprayer application: **DO NOT** apply during periods of dead calm. Avoid application of this product when winds are gusty. **DO NOT** apply with spray droplets smaller than the American Society of Agricultural Engineers (ASAE) medium classification. Boom height must be 60 cm or less above the crop or ground.

Airblast application: **DO NOT** apply during periods of dead calm. Avoid application of this product when winds are gusty. **DO NOT** direct spray above plants to be treated. Turn off outward pointing nozzles at row ends and outer rows. **DO NOT** apply when wind speed is greater than 16 km/hr at the application site as measured outside of the treatment area on the upwind side.

Aerial application: **DO NOT** apply during periods of dead calm. Avoid application of this product when winds are gusty. **DO NOT** apply when wind speed is greater than 16 km/hr at flying height at the site of application. **DO NOT** apply with spray droplets smaller than the American Society of Agricultural Engineers (ASAE) medium classification. To reduce drift caused by turbulent wingtip vortices, the nozzle distribution along the spray boom length **MUST NOT** exceed 65% of the wing- or rotorspan.

Use of the following spray methods or equipment **DO NOT** require a buffer zone: hand-held or backpack sprayer and spot treatment.

The buffer zones specified in the table below are required between the point of direct application and the closest downwind edge of sensitive terrestrial habitats (such as grasslands, forested areas, shelter belts, woodlots, hedgerows, riparian areas and shrublands), sensitive freshwater habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands) and estuarine/marine habitats.

| Method of application | Use site | | Buffer Zones (meters) Required for the Protection of: | | | | |
|---|---|---|---|---|---|---|---|
| | | | Freshwater Habitat of Depths: | | Estuarine/Marine Habitats of Depths: | | Terrestrial habitat |
| | | | Less than 1 m | Greater than 1 m | Less than 1 m | Greater than 1 m | |
| Field sprayer* | Brussels sprout, Outdoor flowers / ornamentals | | 10 | 5 | 5 | 3 | 0 |
| | Flowering Prunus, Forsythia, Lilac, Rose, Cranberry | | 15 | 5 | 10 | 4 | 0 |
| | Potatoes, peppers, eggplant | | 40 | 20 | 20 | 10 | 1 |
| | Strawberries, squash, pumpkin, melon, watermelon, cucumbers, onion, celery | | 20 | 10 | 10 | 5 | 1 |
| | Beet | | 25 | 10 | 15 | 5 | 1 |
| | Carrot, cabbage, broccoli, cauliflower | | 25 | 10 | 10 | 5 | 1 |
| | Spinach | | 15 | 5 | 10 | 4 | 0 |
| | Tomatoes | | 45 | 20 | 25 | 10 | 1 |
| | Beans | | 35 | 15 | 20 | 10 | 1 |
| | Hops | | 25 | 10 | 10 | 5 | 1 |
| Airblast | Apricots, Peaches (except leaf curl) | Early growth stage | 45 | 35 | 40 | 30 | 0 |
| | | Late growth stage | 35 | 30 | 30 | 20 | 0 |
| | Peach (leaf curl) | Early growth stage | 40 | 30 | 30 | 20 | 0 |
| | Cottoneaster, crabapple, hawthorn, mountain ash, quince | Late growth stage | 40 | 30 | 35 | 25 | 0 |
| | Arborvitae, cedar, fir, juniper, pine, spruce | Early growth stage | 55 | 45 | 45 | 40 | 1 |
| | | Late growth stage | 45 | 35 | 35 | 30 | 1 |
| | Raspberries | Early growth stage | 55 | 45 | 50 | 40 | 1 |
| | | Late growth stage | 45 | 35 | 40 | 30 | 1 |
| | Sweet and sour cherries | Early growth stage | 55 | 45 | 45 | 35 | 1 |
| | | Late growth stage | 45 | 35 | 35 | 25 | 1 |
| | Grapes | Early growth stage | 60 | 55 | 55 | 45 | 2 |
| | | Late growth stage | 50 | 45 | 45 | 35 | 2 |
| | Walnuts | Early growth stage | 50 | 45 | 45 | 35 | 1 |
| | | Late growth stage | 40 | 35 | 35 | 25 | 1 |
| | Apple, pear | Early growth stage | 60 | 50 | 50 | 40 | 1 |
| | | Late growth stage | 50 | 40 | 40 | 35 | 1 |
| | Currants, gooseberries | Early growth stage | 55 | 45 | 50 | 40 | 1 |
| | | Late growth stage | 45 | 35 | 40 | 30 | 1 |
| | Sour cherries (brown rot, leaf rot) | Early growth stage | 55 | 45 | 45 | 40 | 1 |
| | Blueberry (highbush) | Early growth stage | 55 | 45 | 50 | 40 | 1 |
| | | Late growth stage | 45 | 35 | 40 | 30 | 1 |
| | Nectarines | Early growth stage | 45 | 35 | 40 | 30 | 0 |
| | | Late growth stage | 35 | 25 | 30 | 20 | 0 |
| | Filbert/ Hazelnut | Early growth stage | 55 | 50 | 50 | 40 | 1 |
| | | Late growth stage | 45 | 40 | 40 | 30 | 1 |

| Method of application | Use site | | Buffer Zones (meters) Required for the Protection of: | | | | |
|---|---|---|---|---|---|---|---|
| | | | Freshwater Habitat of Depths: | | Estuarine/Marine Habitats of Depths: | | Terrestrial habitat |
| | | | Less than 1 m | Greater than 1 m | Less than 1 m | Greater than 1 m | |
| Aerial | Peppers | Fixed-wing | 200 | 125 | 150 | 85 | 0 |
| | | Rotary-wing | 125 | 80 | 90 | 55 | 0 |
| | Potatoes (early and late blight) | Fixed-wing | 200 | 125 | 125 | 60 | 0 |
| | | Rotary-wing | 125 | 75 | 80 | 40 | 0 |
| | Potatoes (late blight during harvest) | Fixed-wing | 200 | 125 | 150 | 85 | 0 |
| | | Rotary-wing | 125 | 80 | 90 | 55 | 0 |
| | Tomatoes | Fixed-wing | 200 | 125 | 150 | 75 | 1 |
| | | Rotary-wing | 125 | 75 | 85 | 45 | 1 |

* For field sprayer application, buffer zones can be reduced with the use of drift reducing spray shields. When using a spray boom fitted with a full shield (shroud, curtain) that extends to the crop canopy, the labeled buffer zone can be reduced by 70%. When using a spray boom where individual nozzles are fitted with cone-shaped shields that are no more than 30 cm above the crop canopy, the labeled buffer zone can be reduced by 30%.

III) The following statements must be included in a section entitled **ENVIRONMENTAL HAZARDS.**

TOXIC to birds, small wild mammals, aquatic organisms and non-target terrestrial plants. Observe buffer zones specified under DIRECTIONS FOR USE.

To reduce runoff from treated areas into aquatic habitats avoid application to areas with a moderate to steep slope, compacted soil, or clay.

Avoid application when heavy rain is forecast.

Contamination of aquatic areas as a result of runoff may be reduced by including a vegetative strip between the treated area and the edge of the water body.

D. For products registered for use as wood or material preservatives, for direct aquatic uses and for use on tree seedlings or nursery stock containers:

I) The following statements must be included in a section entitled **PRECAUTIONS**.

a) For all products:

Remove personal protective equipment immediately after handling this product. As soon as possible, wash thoroughly and change into clean clothing.

Remove clothing/personal protective equipment immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Discard clothing and other absorbent material that have been drenched or heavily contaminated with the product's concentrate. Do not reuse them.

For cleaning/maintaining personal protective equipment, use detergent and hot water. Keep and wash personal protective equipment separately from other laundry.

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

If gloves are required on the label, wash the outside of gloves before removing.

b) For products containing cuprous oxide, copper sulphate or cupric oxide:

Wear long pants, a long-sleeved shirt and shoes plus socks during mixing/loading, application, clean-up and repair.

c) For products containing copper hydroxide, copper sulphate pentahydrate or metallic copper or copper oxychloride:

Wear goggles, long pants, a long-sleeved shirt and shoes plus socks during mixing/loading, application, clean-up and repair. In addition, wear chemical-resistant gloves during mixing/loading, clean-up and repair.

II) The following statements must be included in a section entitled **DIRECTIONS FOR USE**.

a) For all products

**DO NOT** apply this product in a way that will contact workers or bystanders, either directly or through drift. Only protected handlers may be in the area during application.

**DO NOT** contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

b) For products registered for use as wood or material preservatives or for use on tree seedlings or nursery stock containers

**DO NOT** apply this product directly to freshwater habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs and wetlands), or estuarine/marine habitats.

c) For products registered for direct aquatic use

For use in water wholly confined to the property of the user and where there is no outflow beyond the property limits.

d) For products registered for the treatment of potable water sources

For applications in water destined for use as drinking water, those waters must receive additional and separate potable water treatment. **DO NOT** apply more than 1.0 ppm as metallic copper in these waters.

III) The following statements must be included in a section entitled **ENVIRONMENTAL HAZARDS.**

a) For product registered for direct aquatic use

TOXIC to aquatic organisms.

# Appendix V Uses Eligible for Continued Registration for Products Containing Copper

| Use site | Maximum Single Application Rate (kg $Cu^{2+}$/ha)[1] | Maximum Number of Applications per Year | Minimum Application Interval (day)[2] |
|---|---|---|---|
| **Food/Feed Crops** | | | |
| Apple trees (Ground application to control fireblight) | 2.0 | 2 | 7 |
| Apples (To control apple blister spot) | 1.59 | 3 | 10 |
| Apples, pears (To control fireblight) | 1.59 | 10 | 5 |
| Apricots, peaches | 4.5 | 1 | n/a |
| Peach | 1.0 | 2 | 7 |
| Cherries (Sweet/sour) | 4.5 | 2 | 7 |
| Sour cherries | 1.0 | 10 | 7 |
| Nectarines | 2.12 | 2 | 7 |
| Filberts, hazelnuts | 4.5 | 3 | 10 |
| Walnuts | 2.0 | 4 | 7 |
| Potatoes | 2.0 | 10 | 5 |
| Beets | 2.12 | 6 | 7 |
| Raspberries | 2.65 | 4 | 14 |
| Highbush blueberries | 2.0 | 6 | 14 |
| Cranberries | 2.0 | 3 | 10 |
| Currants, gooseberries | 2.65 | 4 | 10 |
| Strawberries | 2.01 | 5 | 7 |
| Beans | 2.92 | 6 | 7 |
| Carrots, cabbages, broccoli, cauliflowers | 2.12 | 5 | 7 |
| Celeries | 2.0 | 5 | 5 |
| Brussel sprouts | 2.12 | 2 | 14 |
| Cucumbers | 2.0 | 5 | 7 |
| Pumpkins, squashes, watermelons, melons | 1.59 | 5 | 5 |
| Eggplants | 2.12 | 10 | 3 |
| Onions | 1.5 | 6 | 10 |
| Peppers | 2.12 | 10 | 3 |

| Use site | Maximum Single Application Rate (kg $Cu^{2+}$/ha)[1] | Maximum Number of Applications per Year | Minimum Application Interval (day)[2] |
|---|---|---|---|
| Spinaches | 1.33 | 5 | 7 |
| Tomatoes | 2.39 | 10 | 3 |
| Grapes | 3.0 | 7 | 3 |
| Hops | 2.65 | 4 | 7 |
| **Ornamentals, Forests and Woodlots** | | | |
| Outdoor flowers/ornamentals | 0.43 | 10 | 7 |
| Cottoneaster, crabapple, hawthorn, mountain ash, quince | 0.63 | 10 | 7 |
| Arborvitae, cedar, fir, juniper, pine, spruce | 2 | 5 | 10 |
| Flowering Prunus spp., forsythia, lilac, rose | 3.0 | 2 | 7 |
| Nursery stock containers | 5.4 g $Cu^{2+}/m^2$ | 1 | n/a |
| Tree seedling containers (Product formulated as a ready-to-use paint) | n/a | | |
| **Industrial Sites** | | | |
| Industrial sites (Product formulated as an impregnated fabric) | 6 g $Cu^{2+}/m^2$ | n/a | n/a |
| **Direct Aquatic** | | | |
| Industrial and farm ponds, municipal water supply reservoir, ponds, dugouts, lagoons and potable water storage tanks, pits, gutters, slurry reservoirs, animal drinking water tanks | 1 ppm | n/a | n/a |
| Sewage water and animal water pits | 2 ppm | n/a | n/a |
| Organic (Fermenting) sludges | 2.5 ppm | n/a | n/a |
| Highly contaminated pits | 10 ppm | n/a | n/a |
| Swimming pools | n/a | | |

[1] Maximum amount of metallic copper that may be applied to a hectare for each application. Product labels must also include application rates described in liquid units or kilograms of total product.

[2] Minimum number of days between each application.

n/a Not applicable

# References

## A. Information Considered for the Chemistry Risk Assessment

## Studies/Information Submitted By Applicant/Registrant (Unpublished)

### Cuprous Oxide

PMRA Document Number: 1515588
Reference: CUP-NDX-2: Correspondance: Nordox Cuprous Oxide Powder Paint Grade, DACO: 2.99

PMRA Document Number: 1518023
Reference: 1988, CUP-NDX-2: Confidential Attachment to Chemistry, Part 2, Nordox Cuprous Oxide Paint Grade, DACO: 2.99

PMRA Document Number: 1518040
Reference: 1989, Volume 5: Chemistry: First Supplement (Part 2): Nordox Cuprous Oxide Paint Grade, DACO: 2.99

PMRA Document Number: 1319580
Reference: 2004, Chemistry Data for Registration of SCM Metal Products Cuprous Oxide, PMRA-2004, DACO: 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7

PMRA Document Number: 1319581
Reference: 2004, Chemistry Data for Registration of SCM Metal Products Cuprous Oxide, PMRA-2004, DACO: 2.11.1, 2.11.2, 2.11.3, 2.8,2.9

PMRA Document Number: 1319019
Reference: 2004, Technical Chemistry file - CUP-SMK-1, Chemistry Data for Registration of SCM Metal Products Cuprous Oxide. Attachments I to X., PMRA-2004, DACO: 2.11.2, 2.11.3, 2.12.1, 2.12.2, 2.13.1, 2.13.2, 2.13.3, 2.13.4

PMRA Document Number: 1319583
Reference: 2004, Chemistry Data for Registration of SCM Metal Products Cuprous Oxide, PMRA-2004, DACO: 2.11.4

PMRA Document Number: 1318966
Reference: 2004, SCM Metal Products Cuprous Oxide, containing Cuprous Oxide, DACO: 2.13.1, 2.13.3, 2.99

PMRA Document Number: 1469548
Reference: Response data. Received 2004-05-21 CUP-AMT-2, DACO: 2.13.3

PMRA Document Number: 1261720
Reference: IMEP Chemistry data. DACO: 2.0

PMRA Document Number: 1432644
Reference: 2007, Arsenic Study Chem Copp HPIII, DACO: 2.13.3

PMRA Document Number: 1469225
Reference: Information Migrated From TGAI. Chemistry Paper Files Red Copp 97N, Registration Number 21244, CUP-AMT-2, DACO: 2.99

PMRA Document Number: 1469221
Reference: Information Migrated From TGAI. Chemistry Paper Files Lolo Tint 97, Registration Number 21242, CUP-AMT-2, DACO: 2.99

PMRA Document Number: 1469224
Reference: Information Migrated From TGAI. Chemistry Paper Files Purple Copp 97N, Registration Number 21243, CUP-AMT-2, DACO: 2.99

**Copper Sulfate Pentahydrate**

PMRA Document Number: 1553812
Reference: Chemical and Physical Properties, DACO: 2.14, 2.14.1, 2.14.10, 2.14.11, 2.14.13, 2.14.2, 2.14.3, 2.14.4, 2.14.5, 2.14.6, 2.14.7, 2.14.8, 2.14.9, 2.16

PMRA Document Number: 1549009
Reference: Chemistry Requirements for TGAI or ISP 1998 and 1999 Reviews, CUS-COH-1, DACO: 2.0

PMRA Document Number: 1548955
Reference: 1994, Specifications and Analytical Methodology Required for Registration of Triangle Brand Cupric Sulphate Pentahydrate Technical., DACO: 2.1, 2.10, 2.11, 2.12, 2.13, 2.14, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9

PMRA Document Number: 1548962
Reference: 1994-1995, Chemistry Data Used to Support a Technical Class Product. Responses to Chemist Requests, CUS-PSD-2, DACO: 2.99

PMRA Document Number: 1548932
Reference: Technical Chemistry Data to Support Blue Viking Industrial, CUS-DET-1, DACO: 2.1, 2.13.1, 2.13.3, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9

**Copper Oxychloride**

PMRA Document Number: 1549091
Reference: 1997, Chemistry Data Used to Support a Technical Class Product, CUY-IQV-1, DACO: 2.99

PMRA Document Number: 1504308
Reference: 2002, Batch Data, 3284/01, DACO: 2.13.3

PMRA Document Number: 1699777
Reference: 2008, DACO: 0.1.6003

PMRA Document Number: 1504306
Reference: Manufacturing, DACO: 2.11, 2.11.1, 2.11.2, 2.11.3, 2.11.4

PMRA Document Number: 1564309
Reference: DACO: 1.6

**Copper Hydroxide**

PMRA Document Number: 1134434
Reference: 1995, Specifications and Analytical Methodology Required for Registration of Champion Technical Copper Hydroxide and Exhibit A, DACO: 2.1, 2.10, 2.12, 2.13, 2.14, 2.15, 2.16, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9

PMRA Document Number: 1138027
Reference: 2004, Nufarm NUP 8A 04, Copper Hydroxide Product Chemistry Volume II; Product Identity and Composition, Description of Materials Used to Produce the Product, Description of the Production Process, and Discussion of Formation of Impurities and Confidential

PMRA Document Number: 1138048
Reference: 2004, Nufarm NUP 8A 04 Copper Hydroxide Product Chemistry Volume III; Preliminary Analysis, Certified Limits and Enforcement Analytical Methods and Confidential Attachment, CHB-RP-PCV-156-T-1, DACO: 2.13.1, 2.13.2, 2.13.3, 2.13.4

PMRA Document Number: 1138219
Reference: 2004, Nufarm NUP 8A 04 Copper Hydroxide Product Chemistry Volume IV; Product Properties: Color, Physical State, Odor, Storage Stability, Corrosion Characteristics, pH, Density, and Particle Size Distribution, CHB-RP-PCV-157-T-1, DACO: 2.14

PMRA Document Number: 721295
Reference: 2002, Manufacturing Summary GX-624-Direct Manufacturing Process, P99-040, MRID: N/S, DACO: 2.11.1, 2.11.2, 2.11.3, 2.11.4

PMRA Document Number: 721303
Reference: 1999, General Chemistry Data Development for Direct Process Cupric Hydroxide, P99-013, MRID: N/S, DACO: 2.13.2, 2.13.3, 2.13.4

**Metallic Copper Powder**

PMRA Document Number: 639316
Reference: 2003, Technical Chemistry file CUL-WOA-1, Determination of Copper and Copper Powders Samples Analysis As Per Quotation, DACO: 2.13.2, 2.13.3, 2.13.4

**Cupric Oxide**

PMRA Document Number: 1555701
Reference: 1981, Analytical Method for Impurities in NP-55 Technical, DACO: 2.13.1, 2.13.4

PMRA Document Number: 1557616
Reference: Chemistry Data Used to Support a Technical Class Product. Submitted Sept. 2, 1980. SOD-NIN-3, DACO: 2.99

## B. Additional Information

The USEPA revised RED document for copper-containing pesticides (May 2009) is available on the USEPA Pesticide Registration Status page at http://www.epa.gov/pesticides/reregistration/status.htm.